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ERNOBIUS MOLLIS (L.) (COLEOPTERA: ANOBIIDAE) ESTABLISHED IN CALIFORNIA

STEVEN J. SEYBOLD[1] AND JONATHAN L. TUPY[2]
Department of Entomological Sciences, 201 Wellman Hall,
University of California, Berkeley, California 94720

Abstract.—The bark anobiid, *Ernobius mollis* (L.), was collected in Oakland, California; thus providing the first unequivocal North American record of this species west of Texas. Adult and larval *E. mollis* were collected from a laboratory cage containing the originally infested branches over a nineteen-month period, and adults were observed *in copulo,* suggesting re-infestation of the same bark-covered wood. Because *E. mollis* is generally considered among pests of structures in Europe and the southern hemisphere, the literature pertaining to *E. mollis* is reviewed here in the event that it may assume economic importance in California.

Key Words.—Insecta, *Ernobius mollis,* California

We have found the bark anobiid, *Ernobius mollis* (L.) (Coleoptera: Anobiidae) in branches cut from a Norway spruce, *Picea abies* (L.) Karsten, planted as an ornamental tree (diameter at breast height 30.5 cm) in a homeowner's yard in Oakland, California. Adults and larvae were also observed in the stem of the declining, yet live, tree from which the branches were cut. In both the stem and branches, the adults and larvae were clustered together with adults and larvae of the Monterey pine engraver beetle, *Ips mexicanus* (Hopkins) (Coleoptera: Scolytidae). In the cut branches, adult and larval *E. mollis* were also intermixed with adults and larvae of the California five-spined ips, *I. paraconfusus* Lanier. Larval *E. mollis* had excavated extensive tunnels in the phloem and bark that contained uniformly shaped, dark fecal pellets. The mines deeply scored and sometimes entered the xylem.

Branches (diameter 3–7 cm) containing larvae, pupae, and adults were collected on 22 Feb 1990 and placed into a laboratory cage at room temperature (16.1° C–29.4° C). Adults began emerging from the branches immediately, and 28 insects emerged over a two-month period with a peak emergence occurring between 15 Mar 1990 and 1 Apr 1990. Additional adults, many of which were alive, were recovered from the cage on the following dates: 17 Nov 1990 (1); 27 Apr 1991 (16); 11 May 1991 (3); 8 Jun 1991 (9); 13 Oct 1991 (42); 18 Jul 1992 (543, including 97 live beetles); 30 Jul 1992 (114, including 88 live beetles); 15 Sep 1992 (115, including 22 live beetles); and 24 Sep 1992 (4, including 1 live beetle). In addition, larvae were found on the bottom of the same cage on: 18 Jul 1992 (37, including 19 live larvae); 15 Sep 1992 (6, all alive); and 24 Sep 1992 (2, both alive). On 18 Jul 1992, adults were observed mating on the bark surface, and on 30 Jul 1992 eight different pairs were recovered *in copulo* from the cage. Living larvae were also recovered from the floor of a second cage containing stem material from the same tree, thirteen months after that material was placed into the cage. This long period of collection of live adults suggests either (1) delayed emergence

[1] Current address: Forest Service, United States Department of Agriculture, Pacific Southwest Research Station, P.O. Box 245, Berkeley, California 94701.
[2] Current address: Tularik, Inc., 270 East Grand Avenue, South San Francisco, CA 94080.

or (2) re-infestation of the same bark-covered branches or stem material; observation of mating adults seems to suggest the latter.

Ernobius mollis, referred to as the bark anobiid (Tooke 1946), pine bark anobiid (Hockey 1985), or the false furniture beetle (Bevan 1987) and as the "Weiche or Feinhaarige Nagekäfer or Klopfkäfer" (Gr: soft or finely haired, gnawing or knock beetle) (Schmidt 1971), has long been included among the pests of structures in Europe (Kemner 1915; Trägårdh 1938; Bletchley 1964, 1967). Hockey (1985) states that *E. mollis* is univoltine with adults present in spring and early summer. Its biology in Europe has been studied by Gardiner (1953); she lists coniferous softwoods, such as *Larix decidua* Miller, *P. abies, Pinus canariensis* C. Smith, *Pinus nigra* Arnold, *Pinus pinaster* Aiton, *Pinus radiata* David Don, *Pinus sylvestris* L., *Pinus taeda* L., and *Pseudotsuga taxifolia* (Poiret) Britton [= *menziesii* (Mirbel) Franco] as recorded hosts. *Ernobius mollis* does not appear to attack hardwoods. Although there are reports of damage to flooring, veneer, and furniture, *E. mollis* appears to be most often associated with bark-covered timbers installed or stored in new structures, rustic cottages, museums, or sawmill yards. Tooke (1949), Bletchley (1967), and Schmidt (1971) suggest that floorboards, veneers, and finishings might be damaged when *E. mollis* emerges from underlying support pieces containing bark. *Ernobius mollis* has even been noted to attack unfinished edges and knots in rough sawn boards, presumably deriving nourishment from the occluded bark around the knot (Tooke 1946, Bletchley 1967). Dominik (1958) has observed that several generations of *E. mollis* will attack the same piece of bark-covered wood. However, it is doubtful that this species can reinfest wood products once the bark has been removed or depleted by infestation. Because of its requirement for bark, which is rarely present in large quantities in modern home construction, Bletchley (1965) states that an active *Ernobius* infestation, although uncommon, is chiefly found in comparatively new homes.

In the forest, *E. mollis* is prevalent in burned timber (Clarke 1932) and has been noted in dead standing trees up to 20.0 cm in diameter (Kelsey 1946). In contrast with our observation in Oakland, Tooke (1946) states that *E. mollis* does not attack living trees or green wood. In fact, he found that *E. mollis* had a preference for dry seasoned timber and would only attack wood in timber stacks that had been seasoned for over six months. However, Tooke (1949) reports that infestations may commence in dead branches of living trees and spread down into the main trunk. In Great Britain, Bletchley (1967) indicates that the natural habitat for *E. mollis* is "recently dead softwood trees or fallen branches where the bark is still present," but Bevan (1987) notes that *E. mollis* causes obvious damage symptoms but has slight or no effect on "pole and older" sized conifers. In France, Roques (1983) describes damage by *E. mollis* to cones of the exotic species, *Sequoiadendron giganteum* Buchholz and *P. menziesii.*

Unger (1986) reports that larval damage is almost always restricted to the "Rinde" (Gr: inner and outer bark), giving the bun-shaped (Kelsey 1946) or lentil-shaped (Schmidt 1951) fecal pellets a brown color. Gardiner (1953) also states that the larva is restricted to the bark, but that the pupal cell penetrates the outer part of the wood. However, most authors (Clarke 1932; Kelsey 1946; Tooke 1946; Schmidt 1951, 1971; Dominik 1958; Bletchley 1967; Hickin 1968; Hockey 1985) suggest that the feeding by late stage larvae includes the xylem, which is consistent with our observations in California. Feeding by larvae results in frass that contains

both dark- (from the bark) and light-colored (from the sapwood) fecal pellets (Bletchley 1967). Schmidt (1971) states that fecal pellets from bark feeding are egg-shaped, although those from sapwood feeding are lentil-shaped. Microscopic examination of the fecal pellets can be used as a diagnostic character to differentiate damage by *E. mollis* from more economically important species (Schmidt 1951). According to Schmidt (1971) and Unger (1986), occurrences of *E. mollis* in Europe have been more frequent in recent years. However, Becker (1984) characterizes the damage as "relatively harmless." Preventative treatment involves timely removal of bark from wood intended for service in building construction (Bletchley 1967, Hockey 1985, Unger 1986).

From its native distribution in northern Europe, *E. mollis* has been introduced into the North American continent and the southern hemisphere (Tooke 1946, Casimir 1958, Hickin 1968). Tooke (1946) describes the entry of *E. mollis* into South Africa in 1937 via packing crates containing machinery for a sawmill. The crates were constructed of pine slabs that had a considerable surface area of bark, but during crate construction the infested, bark-covered regions of the slabs were turned inward and not readily visible. From the sawmill, the insect spread rapidly throughout the country in infested products.

Sometime during this century *E. mollis* became established in eastern North America (Craighead 1950, Simeone 1962) with collection records from Ontario to Nova Scotia in the north, and Texas to Florida in the south (White 1982). Simeone (1962) noted that although *E. mollis* appears to be quite abundant in the major insect collections in eastern North America, it was reported in only one instance in a survey of structural pest cases in New York state. Although historically it appears to have been of little significance in structures in North America, during the last decade it has been frequently found damaging bark-covered logs used in home and cabin construction in New York (J. B. Simeone, personal communication). In South Africa, New Zealand, and Australia, where *P. radiata* has been planted extensively and used for building material, *E. mollis* has been (Casimir 1958), and continues to be (Hockey 1985), a damaging pest of timber and occasionally buildings. In an examination of specimens at the California Academy of Sciences in San Francisco, we have found U.S. and Canadian locality records consistent with White (1982), and we noted five specimens collected in 1931 from Tokyo, Japan.

Although there are no California Department of Food and Agriculture interception records for *E. mollis,* our collection from Oakland is not the first North American record of this insect west of Texas. There is one specimen labelled *Ernobius mollis* in the University of California Essig Museum collected in 1952 and labelled "Slab crate, *ex* Michigan, Hueneme Calif." This interception most likely occurred in southern California at Port Hueneme located 6 km S of Oxnard. Our experiences show that this species is established in Oakland, California. This insect may have spread to California through rough-wood packing case timbers from the ports of Oakland or San Francisco as occurred in South Africa. However, it could also have entered the state through interstate overland commercial or residential traffic. It is significant that we found *E. mollis* contributing to the death of a living tree in California, because it appears to have caused greater damage as an introduced insect than it did in its old world habitat (Hickin 1968).

Although we have recovered this insect from a European tree species that has

been listed as one of its principal hosts (Gardiner 1953), it is important to note that *E. mollis* has again been introduced into a region that has abundant plantings of *P. radiata. Ernobius mollis* could act in concert with *Ips* spp. (unpublished data) and pitch canker disease (McCain et al. 1987) to contribute to mortality of *P. radiata.* Because of its requirement for sapwood with bark attached, it is doubtful that *E. mollis* will play a major role as a structural pest in urban California. In contrast to the situation in the southern hemisphere, the widespread urban and native stands of *P. radiata* in the San Francisco Bay Area are not used for wood products. However, it could enter structures through firewood and thus damage rustic finishings. It is important that pest control operators distinguish between the symptoms of damage by *E. mollis* and that by the California deathwatch beetle, *Hemicoelus gibbicollis* (LeConte). The latter species re-infests finished wood products, but the former does not. The adults and galleries of these species could be difficult to distinguish; however, they produce distinctive fecal pellets. In contrast to the bun-shaped, often dark-colored pellets produced by *E. mollis, H. gibbicollis* produces elongated, light-colored pellets.

Record.—CALIFORNIA. *ALAMEDA* Co.: 2 km SE of Lake Merritt, Greenwood Avenue, Oakland, 22 Feb 1990, S. J. Seybold, *Picea abies.*

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